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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/665,204

09/22/2003

Gang Wang

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01/18/2007

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP

1725 K STREET, NW

SUITE 1000

WASHINGTON, DC 20006

EXAMINER

SEFER, AHMED N

ART UNIT

PAPER NUMBER

2826

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/665,204

**Applicant(s)**

WANG ET AL.

**Examiner**

A. Sefer

**Art Unit**

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 17-21 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-21 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/6/2006 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. Claims 17 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitation "said ... layers are arranged ..." in last line of claim 17. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 17-19, 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuoka et al. ("Matsuoka") USPN 5,557,117.

Matsuoka discloses in fig. 2 a semiconductor light-receiving device for high-speed and large-capacity optical fiber communication comprising: a semi-insulating substrate 1; a

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semiconductor layer 2a of a first conduction type that is formed on the semi-insulating substrate; a buffer layer 3a of the first conduction type that is formed on the semiconductor layer; a light absorption layer 5a that is formed on the buffer layer -- note that generating carriers in accordance with incident light is a desired result rather than a structural limitation. See *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971; *In re Danly*, 263, F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959); a semiconductor layer of a second conduction type 6a that is formed on the light absorption layer; a semiconductor intermediate tunneling layer 4a of the first conduction type that is interposed between the buffer layer and the light absorption layer and having a higher impurity concentration than the buffer layer, wherein said substrate and layers are arranged to form a semiconductor light-receiving device.

As for claims 18 and 19, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 21, Matsuoka discloses the light absorption layer and the semiconductor layer of the second conduction type form a mesa structure, with light entering the light absorption layer through a side surface of the light absorption layer that is exposed in a process of forming the mesa structure.

5. Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by Matsuoka.

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Matsuoka discloses in fig. 5 a semiconductor light-receiving device for high-speed and large-capacity optical fiber communication comprising: a semiconductor substrate of a first conduction type; a buffer layer 3a of the first conduction type that is formed on the semiconductor substrate and having a lower impurity concentration than the semiconductor substrate; a light absorption layer 5a that is formed on the buffer layer -- note that generating carriers in accordance with incident light is a desired result rather than a structural limitation. See *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971; *In re Danly*, 263, F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959); a semiconductor layer 6a of a second conduction type that is formed on the light absorption layer; and a high-concentration semiconductor intermediate layer 4a of the first conduction type that is interposed between the buffer layer and the light absorption layer having a higher impurity concentration than the buffer layer; wherein said substrate and layers are arranged to form a semiconductor light-receiving device.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ajisawa (both of record) in view of Buchanan et al. ("Buchanan") US PG-Pub 2003/0211648.

Ajisawa discloses in fig. 6 a semiconductor light-receiving device comprising: a semi-insulating substrate; a buffer layer 64 of the first conduction type that is formed on the semiconductor layer; a light absorption layer 66 that is formed on the buffer layer and generates carriers in accordance with incident light; a semiconductor layer of a second conduction type 67 that is formed on the light absorption layer; a semiconductor intermediate layer 65 of the first conduction type that is interposed between the buffer layer and the light absorption layer, but lacks anticipation of a semiconductor layer of a first conduction type that is formed on the semi-insulating substrate or a semiconductor intermediate layer having a higher impurity concentration than the buffer layer.

Buchanan discloses in fig. 7 a semiconductor light-receiving device comprising: a semi-insulating substrate 1; a semiconductor layer 5 of a first conduction type that is formed on the semi-insulating substrate; a buffer layer 4g of the first conduction type that is formed on the semiconductor layer; a light absorption layer 4e that is formed on the buffer layer and generates carriers in accordance with incident light; a semiconductor layer of a second conduction type 3 that is formed on the light absorption layer; a high-concentration semiconductor intermediate tunneling layer 4f of the first conduction type that is interposed between the buffer layer and the light absorption layer having a higher impurity concentration than the buffer layer and a thickness and impurity concentration within the recited range (as in claim 19).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Buchanan's teachings with Ajisawa's device since that would produce a large variety of imaging devices as taught by Buchanan.

As for claim 20, Buchanan discloses a contact layer 5 of first conduction type interposed between the substrate and the buffer layer with a predetermined potential being supplied to the contact layer through an electrode.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ANS  
January 8, 2007

  
*A. Sefer*  
*Patent Examiner*  
*Art Unit 2826*